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The six hundred and thirteenth meeting of the Club was held at the Rembrandt Hotel, London, on the 21st January, 1964.

Chairman: Mr. C. W. Mackworth-Praed

Members present, 20; guests, 5.

Dr. R. K. Murton of the Ministry of Agriculture and Fisheries spoke on the Wood Pigeon, on control of its numbers and on experiments made in capturing pigeons by means of foods treated with a narcotic.

The paper was discussed by several members and Dr. Murton replied.

**Moult and colour change in
the Pin-tailed Whydah, *Vidua macroura***

by C. J. O. HARRISON

Received 21st May, 1963

A summary of the moults and plumages of the Pin-tailed Whydah, *Vidua macroura*, was included by Friedmann (1960) in his study of the parasitic weaverbirds. He considered that there was a complete post-nuptial moult into the eclipse plumage and that the nuptial plumage was acquired by a partial body moult involving the head, the sides of the breast, scapulars and lesser coverts; while the remainder of the breeding plumage, with the exception of the remiges which grow at this time, was thought to be acquired by the wearing away of the buff edges, leaving the black portions of the feathers to produce the black part of the plumage. He also quoted the findings of Brown and Rollo (1940) concerning the way in which the buff edges of the feathers dropped off in a short period prior to breeding, in a manner which suggested that something more than normal wear was involved.

In a recent casual examination of some specimens it was observed that in the eclipse plumage the outer third on either side of the feather was warm reddish-buff with a narrow zone of black between. The loss of this buff area would leave a feather which was only a third of the normal width, and similar feathers on adult males in breeding plumage were examined to see if this was so. It was found that the black feathers on males in breeding plumage appear to be similar in width to those on males in eclipse plumage. Taken in conjunction with the earlier statements concerning moult, this would appear to suggest that there had been a spread of black eumelanin in these feathers. This seemed unlikely and a careful examination was therefore made of the large series of skins of this species in the collection of the British Museum (Natural History).

SUCCESSION OF PLUMAGE STAGES

It was found that the skins of males could be grouped into six stages, which were arranged and assigned an alphabetical letter in sequence. Birds in full eclipse plumage were at A and B, and those in full black-and-white breeding plumage at E. The stages were as follows:—

A. These were birds in fresh eclipse plumage. The feathers of the dorsal surface, remiges and rectrices were blackish with broad reddish-buff edges



Fig. A

B. These birds were also in eclipse plumage. The plumage showed varying degrees of wear, in some cases quite considerable and resulting in an extensive loss of buff edges, the feathers tending to have a slightly ragged tapering outline.



Fig. B

There was a little fading, the buff edges of the feathers tending to become paler and less reddish, while the darker parts tended to appear browner. This loss of buff edges was especially noticeable on the tertials, remiges and rectrices.

C. These were birds in a transitional plumage state. The most obvious indication of the partial moult into breeding plumage was the presence of partially grown elongated rectrices. In addition, head and breast showed a variable amount of moult into black or white breeding plumage. White feathers with small buff tips were present on the rump and tail-coverts in place of the streaked black-and-buff feathers of the eclipse plumage which have no white on them. At this stage the feathers of the dorsal surface were a mixture of old and new. Fig. E shows two adjacent tertials from a bird at this stage, the rectrices of which were about two inches long. One of the feathers shown is a worn eclipse one in which



Fig. E

the buff edges are almost completely lost; the other is an obviously new feather with a buff border. An examination of these birds at this stage revealed that there is a general replacement of old worn feathers by new ones which resemble those of the eclipse period in being black with a buff edge. In these new feathers, however, the black central portion has a blue-green gloss to it and the buff edges are narrower, and, on the contour feathers, are confined to two narrow crescentic zones on either side of the tip.



Fig. C

As far as can be seen, this stage appears to involve a complete moult, including remiges and rectrices.

D. These were birds which showed the full breeding plumage, but on which evidence of buff feather edges still persisted. On the contour feathers these were confined to small traces of buff fringes on scattered feathers of the lower mantle, while on the tertials, remiges and rectrices, the buff borders persisted but were reduced by wear to very narrow zones fringing the edges of the feathers. They showed a tendency to fade to a pale creamy colour.



Fig. D

E. These were birds in full breeding plumage in which almost all signs of buff edges had disappeared, although a few showed pale fringes on the tips of the tertials and the edges of the rectrices.

F. These were birds in a transitional stage, moulting from breeding plumage to eclipse plumage. Characteristic individuals showed loss of long remiges, and a mixture of wholly black feathers and new feathers with broad reddish-buff edges on the dorsal tracts.

LOSS OF BUFF EDGES

Reference has been made to the apparent rapidity with which the buff edges are lost on feathers which are mainly black. It is known that the presence of melanin pigments in a feather give it greater mechanical strength and resistance to abrasion. The presence of black eumelanin appears to make a feather stronger than does the presence of brown phaeomelanin. In a study of schizochroism (Harrison, in press) it was found that, in the absence of eumelanin, buff-coloured feathers containing only brown phaeomelanins were prone to rapid fading, and to a heavy loss of structure by abrasion. The difference in wear between the black and the brown portions of feathers in *V. macroura* would appear to be due to this difference in strength. This would not, however, explain why the buff edges should be so rapidly and completely lost.

Some of the feathers from the mantle of individuals of this species were examined under the microscope to see if there was any evidence of a special zone of structural weakness occurring on the barb of the feather at the junction of the change in pigmentation. No such structural variation was found. It is apparent that a single barb will have a strongly resistant eumelanin proximal portion and a less resistant phaeomelanin distal portion. If abrasion occurs the distal portion will tend to yield to pressure. If the whole feather were of a similar type of pigmentation this tendency to yield would be equal throughout the structure, but in the case of feathers such as those under consideration the distal portion will tend to bend while the proximal portion will show greater rigidity. There will therefore be a tendency for a sharp bend to occur at the point where the change of pigmentation takes place, and at this point the barb will be subject to the greatest pressure and therefore tend to fracture, causing the phaeomelanin distal portion to break away. In this way there will be a tendency for the entire buff edge to be lost, due to the difference in strength of the two portions.

Where the buff edge is more extensive and is present on a greater length of the barb, there will be less likelihood of a sudden pressure at one point if the tip of the feather is abraded, and in addition the presence of overlapping feathers extending over the buff area may tend to modify the effect. This might explain why this sudden and complete loss of buff edges is less apparent in plumages such as the eclipse plumage of the male.

CONCLUSIONS

From the evidence of the skins examined it would appear that the Pintailed Whydah, has two complete moults annually, and that at each moult feathers with buff edges appear over most of the dorsal surface. With the exception of the head and breast, the black appearance of the breeding plumage is produced by the loss of the buff edges of feathers resulting

from a complete pre-nuptial moult. In a collection of skins it is possible to find a series which appears to show reduction of buff edges in a gradual succession from the eclipse to the full breeding plumage, and this has tended to conceal the existence of a complete moult between the eclipse and the breeding plumage.

The figures are diagrammatic sketches, not necessarily to scale, intended to show only the extent of the black and the buff (diagonally shaded) colouring.

References:

Brown, Frank A. Jr. and Rollo, M., 1940. Light and molt in weaver finches. *Auk*, 57: 485-498.

Friedmann, H., 1960. The parasitic weaverbirds. *Bull. U.S. Nat. Mus.* 223.

Harrison, C. J. O. Fawn and grey variant plumages. *Bird Study*, in press.

Mottled plumage in the genus *Corvus*

by BRYAN L. SAGE

Received 27th July, 1963

C. J. O. Harrison (1963) has recently dealt with the subject of mottled plumage in various species of the genus *Corvus*, and concludes that this condition is not genetic in origin as originally suggested by Dr. James M. Harrison (1948) and the writer (Sage 1956), but is caused instead by periods of unbalanced diet affecting the rhythm of melanin deposition. Despite his lengthy treatment of the subject I am quite unable to see that he has produced any evidence definitely disproving the genetical theory. Whilst agreeing that the majority of discussion on the subject must perforce be largely theoretical, it may be said that the explanation of the condition as originally proposed is perfectly in accord with simple and orthodox genetics.

Since the publication of my last paper on this subject (Sage 1958) I have done further research on the matter with the result that some of my earlier views are somewhat modified. Furthermore, I feel that C.J.O.H. has included in his discussion several types of plumage variation (i.e. brown plumage, white wing-barring, and fault bars or "hunger traces") which I consider are not in fact analogous, thereby confusing rather than clarifying the situation.

BROWN PLUMAGE TYPES

A mounted specimen of the Raven *Corvus corax* in the collection of the British Museum (Natural History) is described by C. J. O. Harrison (pp. 43-44) as being a dilute partial albino, having the feathers of the lower belly, forehead and throat loose and fluffy in texture, and the pigmented portions of the plumage greyish-brown. The fluffy texture of the plumage of this specimen, which I have myself seen, is presumably due to some defect in the interlocking mechanism of the barbules, the identical factor which gives rise to the "hairy" variety of the Moorhen *Gallinula chloropus*. It may be noted that in the Moorhen this condition is frequently, but by no means invariably associated with depigmentation of the plumage to a greater or lesser degree. I have in my possession a specimen of the Rook *Corvus frugilegus* given to me by the late Alfred Hazelwood of the